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STATISTICAL BULLETIN
Metropolitan Life Insurance Co.

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POLIOMYELITIS IN THE UNITED STATES IN 1931

Not since 1916 has the country suffered from so extensive and destructive an epidemic of poliomyelitis (infantile paralysis) as it has this year. Up to October 17th there was a total of 13,091 cases reported in nineteen of our states which had an aggregate population of over eighty million people. There was, therefore, a sickness rate of twenty-one cases registered for each 100,000 of population. In 1916, the sickness rate was 53.3 per 100,000. There were, therefore, two and a half times as many cases in each unit of the population in the earlier outbreak as in this latest invasion. The disease this year was also much less virulent than in 1916. For the states reporting both deaths and cases in the two years there occurred 10.3 deaths per hundred cases in 1931 as compared with 26.2 deaths per hundred cases in 1916. The total effect on mortality this year was, therefore, very much less than in 1916.

The State of Connecticut appears to have had the largest reported sickness rate this year, 78.9 per 100,000, and Brooklyn leads the cities with a case rate of 94.5 per 100,000. This same city also had the highest incidence rate in 1916, when the figure was 224 per 100,000. The states with case rates exceeding the average, this year, were New Jersey (26.2 per 100,000); New York (55.3 per 100,000); Connecticut (78.9 per 100,000); Massachusetts (37.4 per 100,000); Michigan (25.4 per 100,000); Minnesota (31.0 per 100,000); Rhode Island (28.9 per 100,000); Vermont (29.3 per 100,000); and Wisconsin (28.7 per 100,000). Some of these states actually showed higher reported case rates this year than in 1916, namely, California, Connecticut, Michigan, Vermont and Wisconsin. In the table on page 2 we show the facts available for poliomyelitis in states having information on the disease for 1931 and 1916.

Number of Reported Cases of Poliomyelitis in Selected States, 1931 to Week Ending October 17th, and in Whole Year 1916.

State	Cases in 1931 to Oct. 17		Cases in Whole Year 1916		Deaths per 100 Cases	
	Number	Per 100,000 population (Annual Basis)	Number	Per 100,000 population	1931*	Whole year 1916
Total States Reporting	13,091	20.9	24,784†	53.3	10.3‡	26.2‡
Middle Atlantic States.	6,794	32.0	19,459	89.5	(1)	27.0
New Jersey	864	26.2	4,055	137.6	(1)	29.8
New York	5,650	55.3	13,223	128.7	8.3 (3)	25.5
New York City	3,984	70.7	9,023	161.0	11.3	27.1
Brooklyn	1,972	94.5	4,329	224.4	(1)	26.7
Manhattan	703	48.7	2,551	96.8	(1)	28.5
Other boroughs	1,309	62.2	2,143	20.6	(1)	26.4
Rest of New York State	1,666	36.4	4,200	89.9	(1)	21.9
Pennsylvania	280	3.6	2,181	25.6	(1)	30.6
Other States	6,297	15.3	5,325†	21.5	7.6	20.6
California	244	5.2	132	4.5	(1)	20.5
Connecticut	1,025	78.9	951	76.4	4.9 (3)	25.1
Illinois	577 (6)	8.9	(1)	(1)	(1)	(1)
Indiana	50	1.9	207	7.3	28.1	26.1
Iowa	103	5.2	259	11.7	9.8 (5)	19.7
Maine	84	13.2	149	19.3	12.2	18.8
Massachusetts	1,278	37.4	1,926	51.8	(1)	24.1
Michigan	1,008	25.4	616	20.2	8.3	24.5
Minnesota	636	31.0	909 (2)	39.9	8.7	11.7 (7)
Missouri	60	2.1	(1)	(1)	(1)	(1)
New Hampshire	73	19.6	(1)	(1)	4.5	(1)
North Carolina	77	3.0	(1)	(1)	13.3 (4)	(1)
Ohio	159	3.0	546	10.6	17.8 (5)	23.8
Rhode Island	160	28.9	(1)	(1)	3.7 (4)	(1)
Vermont	84	29.3	64	17.6	3.4	18.8
Wisconsin	679	28.7	475	19.0	5.2	14.1

*For period 1931 to and including week ending September 19.

†Only states with complete reports.

‡Only areas with complete reports for both years. (New York City, Indiana, Maine, Michigan, Vermont and Wisconsin).

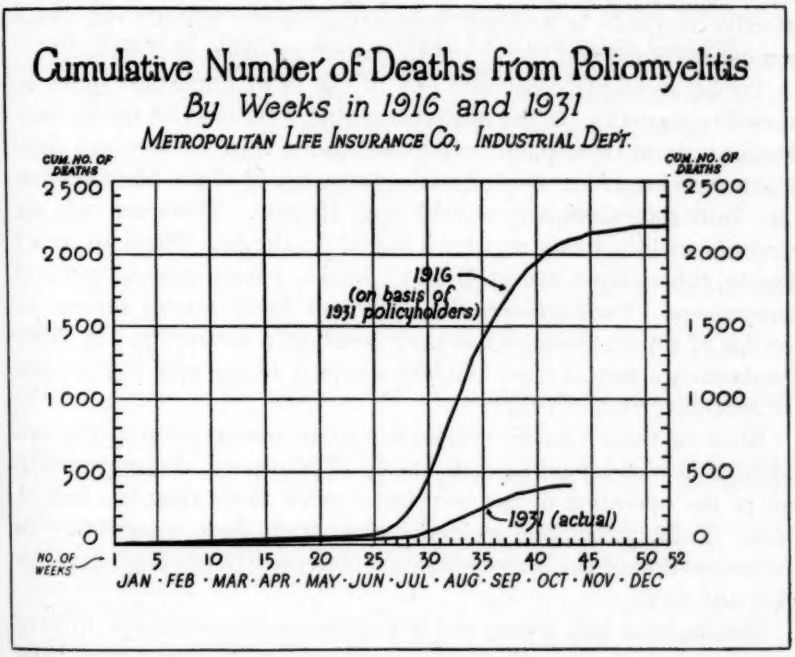
(1) No data; (2) Incomplete; (3) Jan. to Aug. 31; (4) Jan. to Sept. 1; (5) Jan. to July 31; (6) Jan. to Nov. 1 (provisional); (7) Based on incomplete data.

Sources: 1916—Cases: U. S. Public Health Annual Report 1917.
Deaths: Mortality Statistics. U. S. Census Bureau.

1931—Cases: Questionnaires by Statistical Bureau, M. L. I. Co. and U. S. Public Health Reports.
Deaths: Questionnaires by Statistical Bureau, M. L. I. Co.

It may be of interest in this connection to compare the experience this year among children in the Metropolitan Life Insurance Company with that which occurred in 1916. There was a total of 404 deaths from poliomyelitis during the first 43 weeks of 1931. This figure was 81 per cent. below the number which would have prevailed this year if the deathrate had been the same as in 1916. The

following chart shows the cumulative mortality from poliomyelitis among Metropolitan policyholders week by week in 1931 as compared with the mortality expected in 1931 according to the 1916 experience. It will be seen that certain phases of the epidemic from its beginning, its development and its approaching close, show very marked similarities for both years; but this year, from the beginning of the outbreak the curve has been on a much lower level.


Cumulative Number of Deaths from Poliomyelitis
By Weeks in 1916 and 1931
Metropolitan Life Insurance Co, Industrial Dept.
CUM. NO. OF DEATHS
2500
2000
1500
1000
500
0
1916 (on basis of 1931 policyholders)
1931 (actual)
NO. OF WEEKS
1 5 10 15 20 25 30 35 40 45 50 52
JAN · FEB · MAR · APR · MAY · JUN · JUL · AUG · SEP · OCT · NOV · DEC

Fortunately, poliomyelitis in 1931 has been accompanied not only by a much lower case-fatality rate but there seems also to have been a lower incidence of cripplings. It is hoped that a comprehensive review will be made of the year's prevalence of poliomyelitis, similar to the studies which were made by Lavinder, Freeman and Frost* of the 1916 invasion. It is not clear from the preliminary information available on this year's poliomyelitis what the chief characteristics of the epidemic were. The data should be studied both as to case-incidence and case-fatality according to sex, age, existing and previous cases in households or neighborhoods and weather conditions prevailing in the various areas of the country.

*Epidemiologic Studies of the Poliomyelitis in New York City and the Northeastern United States during the year 1916. Public Health Bulletin No. 91. Washington. Government Printer. 1918.

PUBLIC HAZARDS AND ACCIDENT MORTALITY IN RECENT YEARS

Nearly one-half of all the fatal injuries which occur each year among wage-earners and their dependents, take place when those injured are not at home and not engaged in gainful work. For purposes of convenience in the study of the circumstances surrounding fatal accidents, and with the object of bringing about more effective methods in accident prevention, safety officials call these non-occupational and non-domestic casualties *public accidents*.

Public accidents constitute one of the most important items in mortality statistics. In the nine-year period, 1922 to 1930, the average deathrate from these public casualties among wage earners and their dependents insured in the Industrial Department of the Metropolitan Life Insurance Company was 30.7 per 100,000. There are only six conditions which today register a higher deathrate. These are heart disease, tuberculosis, cancer, Bright's disease, pneumonia and cerebral hemorrhage. Furthermore, the hazard of being fatally injured in the use of public facilities has been constantly increasing. In 1930, the deathrate was 33.7 per 100,000, which is 25 per cent. higher than the mortality rate in 1922.

Most of these "public accidents" occur among persons who are riding in or who are hit by some means of transport. Injuries arising out of the operation of motor vehicles cause more than one-half of them. Fatal automobile accidents, aside from those connected with the occupation of the persons injured, increased 57 per cent. between 1922 and 1930.

Deaths from falls arising out of public activities seem also to have increased in recent years. Non-occupational railroad accidents have remained practically stationary since 1922; the street car hazard for the general public, when riding on, or getting in the way of these vehicles has diminished slightly; and fatal injuries from horse-drawn vehicles and from bicycles have declined more than one-half since 1922. The drop in the mortality from injuries arising out of street car and horse-drawn vehicle traffic is due, in large part, to the declining number of such vehicles on the streets and highways. A summary of facts on mortality arising out of the use of public ways and structures among Metropolitan Life Insurance policyholders in the Industrial Department is shown in the table on page 5.

Over the period 1924 to 1930, about one-third of the deaths in automobile accidents were of persons riding in or driving such vehicles. Pedestrians accounted for 56 per cent. of the automobile deaths.

The pedestrian factor in automobile fatalities varies with age. For children under 15 years, 78 per cent. of the automobile killings were of pedestrian children. Among adults, only 44 per cent. of automobile deaths arose out of the pedestrian use of sidewalks, crossings and highways. For adults 42 per cent. of the automobile fatalities were of persons driving or riding in automobiles.

Deathrates per 100,000.
Fatal Accidents Arising Out of Hazards of Public* Places.
By Means of Injury. Metropolitan Life Insurance Company.
Industrial Department, 1922 to 1930.

Means of Injury†	1922 to 1930		Deathrates per 100,000								
	Deathrate per 100,000	Per Cent. of All Public Accidents	1930	1929	1928	1927	1926	1925	1924	1923	1922
All Public Accidents*.....	30.7	100.0	33.7	34.5	31.8	31.8	29.2	29.7	28.7	28.2	26.9
Accidental burns.....	.3	.8	.3	.2	.3	.3	.3	.3	.2	.3	.3
Accidental drowning.....	5.6	18.2	5.5	5.8	6.1	5.5	5.3	5.4	5.8	5.1	5.8
Traumatism by fall.....	1.5	5.0	2.1	2.0	1.4	1.8	1.5	1.4	1.0	1.4	1.1
Means of transport:	21.5	70.2	23.8	24.6	22.3	22.2	20.6	20.5	20.3	20.0	18.2
Steam railroad.....	2.7	8.8	2.4	2.6	2.9	2.8	2.7	2.6	2.7	3.0	2.7
Street cars.....	1.3	4.2	.9	1.1	1.1	1.2	1.3	1.2	1.7	1.6	1.7
Automobiles‡.....	16.7	54.5	19.9	20.0	17.6	17.5	16.0	15.7	15.1	14.2	12.7
Aeroplanes and balloons....	.1	.2	.2	.2	.1	§	.1	§	.1	§	§
Other vehicles.....	.7	2.4	.4	.7	.6	.7	.6	.9	.8	1.1	1.1
Landslide; other crushing....	.1	.2	§	§	§	.1	.1	.1	.1	.1	.1
Electricity (lightning excepted)	.1	.3	.1	.1	.1	.1	.1	.1	.1	.1	.2
Other accidental and unspecified violence.....	1.6	5.3	1.9	1.8	1.6	1.8	1.3	1.9	1.2	1.2	1.2

*Arising out of or in the course of activity not in gainful employment nor in domestic pursuits.
†Titles of the International List of Causes of Death, 1920 Revision.
‡Does not include automobile injuries arising out of or in the course of gainful employment nor in domestic activity.
§Less than .05 per 100,000.

Occupational mortality due to automobile operation is also of interest since a considerable portion of the automobile fatalities affects persons using or driving such machines as an occupation. Among adult policyholders, between 1924 and 1929, seven per cent. of all automobile fatalities arose out of the use of such vehicles in occupational pursuits. The automobile has become an important agency of occupational injury. The bulk of the automobile fatalities (93 per cent.) arises, however, out of the non-occupational pursuits in public places. Only one automobile death in a thousand arises out of pursuits on domestic premises.

It is hoped that the plan for analyzing accidental fatalities according to the three major spheres of human activity—pursuits in the home, at work, or elsewhere—will be developed on a wide scale wherever death certificates are available for study. Only by allocating hazards, means of injury, and consequences of injury, to spheres of human activity will it be possible to detect origins and controllable agencies of accidental injury. There is ground for believing that shortly the principal vital statistics offices in the United States will direct effort and attention at these important angles of the fatal accident problem, so that the originating circumstances of the country's annual accident fatality toll of nearly 100,000 deaths can be more closely scrutinized. It is not only necessary to know where fatal accidents occur, but what the human beings killed in these accidents were doing before they were injured.

THE 1931 RISE IN THE CANCER DEATHRATE

In the October STATISTICAL BULLETIN, attention was directed to the marked rise observed this year in the cancer deathrate of insured wage-earners. At the end of October the increase, as compared with the like period of 1930, was 5.2 per cent. If this situation is in evidence for the completed year, a greater annual increase will be shown than ever before.

The 1931 mortality data for the general population are somewhat fragmentary. In so far as can be discovered at this writing, the increase in the general population of six states with an aggregate of 34 million people has amounted to only three per cent. This is slightly more than one-half that among the wage earners, but nevertheless a little in excess of the average annual increase observed over a long period of years. The data for New Jersey (six months) show an 8.7 per cent. increase and those for Michigan (five months) a 5.7 per cent. rise. In New York and Pennsylvania there were smaller increases; in Florida and Connecticut the rate was lower than in 1930. Forty-two per cent. of the Metropolitan Industrial policyholders live in these six states.

A further analysis of the cancer mortality data of the insured, for the first nine months of 1931, has been made to determine what organs or parts of the body have been chiefly affected by the rise in the deathrate. It appears that there has been an 8 per cent. increase for cancers of the digestive tract and peritoneum. In this group are included the immense number of deaths from cancer of the stomach, liver, gall bladder and intestines. There has been a 6.3 per cent.

increase in deaths from cancer of the breast. On the other hand, the mortality from malignant growths of the female genital organs has actually declined since last year by 3.3 per cent. The deaths from cancers of the above sites now constitute about 70 per cent. of the entire mortality from all malignant growths.

No satisfactory explanation can be made at this time of the much greater increase in cancer mortality this year in the industrial, as compared with the general population. Possibly when data are at hand for both groups for the whole year, they will not show such a wide divergence in the relative increases. Shortly after the data for the entire year are at hand it will be possible to study the facts by color, sex and age; and, in addition, to determine the differences, if any, in the two experiences with reference to the trend of cancer mortality for the various organs or parts of the body.

TWO DECADES—A RETROSPECTIVE SURVEY OF LIFE EXTENSION

With the publication, in this issue, of the expectation of life among the industrial policyholders of the Metropolitan Life Insurance Company in the year 1930, we are rounding out the second decade of the record of longevity in that group of insured persons. It will be interesting to look back over the road we have traveled, and to note the advance we have made. Our life table for the opening biennium of the last decade, 1919-1920, showed an expectation of life at birth for the total Industrial Department of 51.14 years. Going back nearly another decade, we recall, for the years 1911-1912, an expectation of life at birth or mean length of life of 46.63 years. Successive life tables which we have presented annually since 1920 give a gradually ascending series of figures, with here and there a temporary set-back, but culminating, in the year 1930, with a figure of 57.36 years. The year 1930 was in every respect a record health year. This we had known from the current reports of deaths, of which our readers receive a monthly graphic statement in this BULLETIN. But the expectation of life presents to the eye, as probably no other summary could, the resultant of these monthly reports over the entire year.

The table on page 8 gives, briefly, a summary of the expectation of life at birth, among our Industrial policyholders, without distinction of color or sex, for the years 1911-1912, 1919-1920, and from that point on by single calendar years to 1930. It will be seen that we thus record a gain of 10.73 years since 1911-1912, and 6.22 years since

1919-1920. That nearly eleven years have been added to the life of our Industrial policyholders, in the course of two decades, is most gratifying.

Expectation of Life at Birth, Metropolitan Life Insurance Company. Industrial Department 1911, to 1930

Year	Expectation in Years
1930	57.36
1929	55.78
1928	55.88
1927	56.42
1926	55.02
1925	55.51
1924	55.62
1923	54.55
1922	55.04
1921	55.08
1919–1920	51.14
1911–1912	46.63
Gain 1930 since 1911–1912	10.73

HEALTH RECORD FOR OCTOBER, 1931

As each month passes, the prospect becomes better that the year 1931 will record the lowest deathrate in the history of both the United States and Canada. As this is almost assured for the millions of policyholders in the Industrial Department of the Metropolitan Life Insurance Company, it should also obtain for the population at large. In past years, the experience of this large cross-section of the people has always proved to be a sensitive index of the state of the public health in the general population. At the end of October the mortality rate of this large group of insured persons was only two-tenths of one per cent. above the previous minimum—established only last year. Indeed, among approximately 1,100,000 insured persons in the Pacific Coast and Mountain states, and among about 1,200,000 Canadians, the 1931 health record, to date, has been considerably better than ever before. In Canada, this year's improvement over the previous minimum figure amounts to about 7 per cent. At this writing, data are also available for the first three weeks of November, which period registered a lower mortality rate than did the corresponding part of 1930.

The deathrate for the month of October, 7.8 per 1,000, is the minimum for all time for that particular month—although the identical figure was registered once before: in October, 1927.

The outstandingly favorable items in the health record of 1931 are the same as have been pointed out in previous issues of the STATISTICAL BULLETIN during the current year, when it was stated that tuberculosis, diphtheria, diarrheal diseases and puerperal conditions would probably record new minimal deathrates for 1931. It may now be stated that new low mortality rates for these four conditions are virtually assured. The per cent. reductions in their mortality rates over the previous minimal figures are as follows: for tuberculosis, 7.3; for diphtheria, 32.8; for diarrheal diseases, 23.0; and for puerperal conditions, 9.7. Inasmuch as the deathrates for all have continued favorable, up to November 21, it would require unprecedentedly high mortality in the case of any of them, during the remaining weeks of the year, to bring its deathrate up to, or in excess of, the previous low point.

The probability that new high mortality rates would be registered in 1931, for certain diseases, has also become a practical certainty with the closer approach of the end of the year. It may now be stated, beyond peradventure, that higher deathrates than ever before will be registered for cancer, diabetes, heart disease and automobile fatalities.

The deathrate in the general population of the large cities in the United States, in October, was 10.2 per 1,000 estimated population. This is identical with the rate registered in September, but appreciably lower than that for October a year ago (10.8). Increased morbidity, as compared with September, was observed from diphtheria, influenza, measles and scarlet fever; there were fewer cases of poliomyelitis and typhoid fever. Comparison with October of last year shows more sickness from diphtheria, poliomyelitis, scarlet fever and typhoid fever, but lower incidence of influenza, measles and smallpox. These statements are based on the number of cases reported during the first four weeks of September and October, 1931, and of October, 1930.

Diphtheria cases, as reported from 37 states, were nearly double the number occurring in September. This increase is seasonal. The principal increases were in Ohio, Maryland, West Virginia, North Carolina, Kentucky, Tennessee and Mississippi. Cases of scarlet fever, according to reports from 47 states, also nearly doubled in September, with the outstanding increases in Massachusetts, New

York, Pennsylvania, Ohio, Illinois and Missouri. The increases for measles and influenza were small.

Poliomyelitis, with the advent of cool weather in October, showed a decided decline in prevalence, with only 2,682 cases reported from 47 states, as against 4,890 in September.

In October, there was a 33 per cent. increase in smallpox cases, as reported from 47 states. The rise was due, for the most part, to increases in Iowa, Tennessee and Mississippi. The usual seasonal decline was observed in the prevalence of typhoid fever.

The following were among the more noteworthy public health activities of the month. An annual appropriation of $36,200, for three years, was granted by the COMMONWEALTH FUND OF NEW YORK to the Massachusetts Department of Health for a study of pneumonia. The Commonwealth Fund also made available to TULANE UNIVERSITY approximately half a million dollars for use in a long term program of medical and public health education in the State of Mississippi. Seventeen counties in Maryland now have full time health service. This total was reached recently when Garrett, Dorchester and Worcester counties were added to the list. In addition to the seventeen counties that have full time service, Charles and St. Mary's counties form a sanitary district and share jointly in the services of a deputy state health officer. The remaining counties with part time service are Howard, Carolina, Queen Anne's and Somerset. The first full time county health department was formed in 1922, in Allegany County.

The following table shows the mortality among Industrial policyholders for October, 1931; September, 1931, and October, 1930, together with the cumulative rate for the first ten months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department (Annual Basis)

MONTHS OF OCTOBER, 1931; SEPTEMBER, 1931, AND OF OCTOBER, 1930

CAUSES OF DEATH	ANNUAL RATE PER 100,000 LIVES EXPOSED*				
	Oct. 1931	Sept. 1931	Oct. 1930	Cumulative, January to October	
				1931	1930
TOTAL—ALL CAUSES	780.2	797.8	820.8	886.4	884.6
Typhoid fever	4.9	4.7	4.4	2.2	2.2
Measles	.5	.4	.3	3.4	3.2
Scarlet fever	1.9	1.2	1.3	3.2	2.6
Whooping cough	3.3	4.1	2.7	3.6	4.6
Diphtheria	4.0	2.2	5.1	3.9	5.8
Influenza	5.2	4.5	6.8	22.4	14.9
Tuberculosis (All forms)	70.9	69.5	75.9	77.0	83.1
Tuberculosis of resp'y system	63.0	62.0	68.3	68.0	72.3
Cancer	79.7	79.4	83.4	82.3	78.2
Diabetes mellitus	18.4	17.8	17.1	20.6	18.6
Cerebral hemorrhage	55.7	55.9	56.4	61.2	60.4
Organic diseases of heart	125.8	129.7	132.1	148.7	145.5
Pneumonia (All forms)	41.3	32.2	47.1	76.5	76.7
Other respiratory diseases	8.4	7.6	9.3	10.5	11.2
Diarrhea and enteritis	27.0	32.5	39.0	16.4	21.3
Bright's Disease (Chronic nephritis)	58.4	61.2	62.7	66.3	68.3
Puerperal state	10.0	9.8	10.2	11.2	12.4
Suicides	10.0	10.4	10.1	9.8	9.7
Homicides	8.3	6.6	7.0	7.0	6.7
Other external causes (excluding suicides and homicides)	57.0	63.4	60.2	61.2	63.3
Traumatism by automobiles	25.4	25.7	23.7	21.5	20.5
All other causes	189.4	204.7	189.8	198.9	195.7

*All figures in this table include insured infants under one year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

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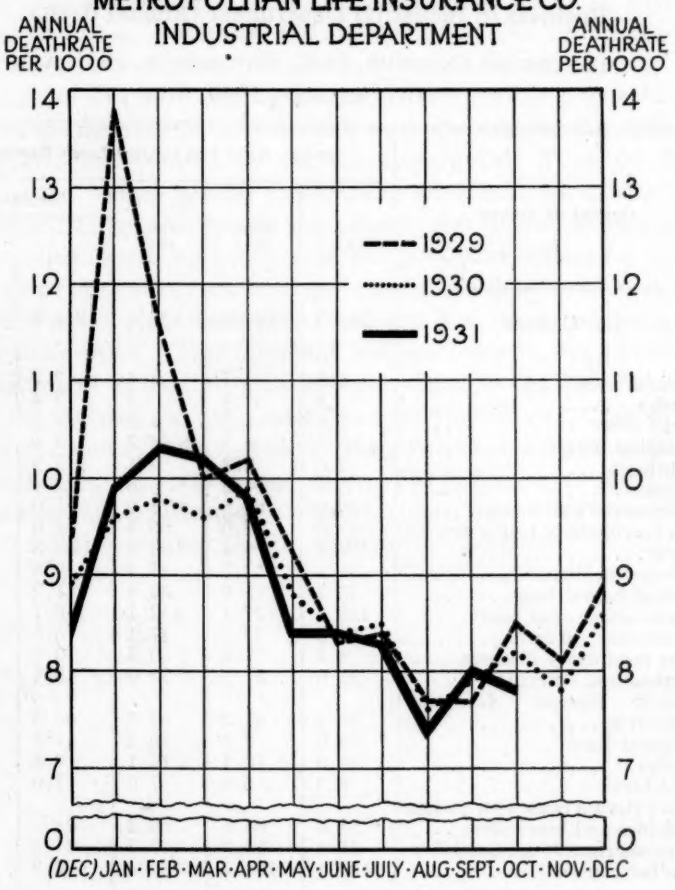

1929	13.8	11.6	10.0	10.2	9.2	8.3	8.4	7.7	7.7	8.5	8.1	8.9
1930	9.6	9.8	9.6	9.9	8.8	8.4	8.5	7.6	7.9	8.2	7.8	8.6
1931*	9.9	10.3	10.2	9.8	8.4	8.4	8.3	7.4	8.0	7.8		

*Rates for 1931 are provisional

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